

Subject card

Subject name and code	Biomolecules - Methods, PG_00196901						
Field of study	Biotechnology						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
Education level	Bachelor's studies	Subject group			Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			3.0		
Learning profile	academic	Assessment form			credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Katarzyna Węgrzyn				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	0.0	30.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	30		5.0		40.0	75
Subject objectives	Seminars aims to provide advanced knowledge about the structure and properties of biomolecules e.g., proteins, nucleic acids, sugars, and lipids) forming more complex biological systems, cellular compartments. The student will acquire practical skills related to preparing presentations on methods of biomolecule isolation, and their biochemical, biophysical, and bioinformatic analysis. During the classes, students will discuss methods in terms of their application in the analysis of biomolecules derived from viruses, prokaryotic cells, and eukaryotic cells.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[BIOTECHL3_U04] The graduate is able to search for, analyse and use scientific information, also in English, in the field of biotechnology in the fields of exact and natural sciences and medical and health sciences; uses electronic sources; has advanced skills in using appropriate databases.		Student is able to prepare and present presentations on methods of biomolecule isolation, their biochemical, biophysical, and bioinformatics analysis. The student is able to discuss methods in terms of their application in the analysis of biomolecules, with particular emphasis on bacteria and extrachromosomal genetic elements (group 1), eukaryotic animal cells (group 2), viruses (group 3), Gram-positive bacteria (group 4), or prokaryotic and eukaryotic plant cells (group 5).			[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report [SU4] test/exam - oral or written [SU5] implementation of a problem task	

Seminar Group Selection**Group 1**

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The mentioned methods will be discussed with examples from the fields of bacterial biochemistry and molecular biology, with particular emphasis on extrachromosomal genetic elements.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 2

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The classes will cover the following topics, with a focus on animal eukaryotic cells as a research model.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 3

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The mentioned methods will be discussed with examples from the fields of molecular biology and virology.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 4

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The mentioned methods will be discussed with examples from the fields of bacterial biochemistry and molecular biology, including Gram-positive bacteria.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 5

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The classes will cover the following topics, with a focus on prokaryotic cells and plant eukaryotic cells as research models.

- methods of nucleic acid isolation

	<ul style="list-style-type: none"> • electrophoretic methods in nucleic acid analysis • PCR • DNA and protein sequencing • protein purification methods • electrophoretic methods in protein analysis • expression systems • methods of labeling and modification of nucleic acids and proteins • methods for detection of nucleic acids and proteins <p>This course includes CGT-related training content, contributing to the Talent-CGT project under the EIT HEI initiative. It is supported by the European Institute of Innovation & Technology (EIT), a body of the European Union.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test+Activity+Presentations	51.0%	100.0%
Recommended reading	Basic literature	Molecular Cloning - A Laboratory Manual by Sambrook, Fritsch, and Maniatis Molecular Cloning - A Laboratory Manual, 4th Edition (2012) by Green, Sambrook Materials prepared by the teacher	
	Supplementary literature	Materials independently searched for and selected by students for the classes using library resources and electronic information sources	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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